

What is Claimed is:

1. An electric motor actuated stop and self-closing check valve for controlling forward-flow and back-flow of liquid in a liquid conveying line and reducing liquid surge pressure transients and slamming of valve components, comprising:

A) a valve body having an inlet port and an outlet port, relative to forward-flow of a liquid,

B) a valve seat disposed within the valve body intermediate said ports,

C) a valve disc disposed within the valve body having an elongated disc stem which extends through the valve body,

said valve disc and disc stem being moveable along the longitudinal axis of said disc stem to either:

i) a closed position whereat the valve disc sealingly engages the valve seat to prevent forward-flow and back-flow of the liquid, or

ii) an open position whereat the valve disc is spaced from the valve seat,

D) a compression spring external to said valve body for providing a selected bias to said valve disc and disc stem toward said closed position;

E) an electric motor operationally attached to said valve, and

F) an actuator rod moveable by action of the

electric motor such that said actuator rod is disposed at either:

i) an extended position of said actuator rod whereat the actuator rod contacts the disc stem and restrains the valve disc at the closed position preventing forward-flow and back-flow of the liquid, or

ii) a retracted position of said actuator rod whereat the actuator rod is retracted any amount from said extended position to be at a selectable retracted position, and at all selectable retracted positions of said actuator rod the valve disc is moveable along the longitudinal axis of the disc stem, without further action by the electric motor, such that:

a) the valve disc moves to the open position solely through action of forward flowing liquid on the valve disc and forward-flow of the liquid occurs, and

b) the valve disc moves to the closed position through action of said compression spring and momentary back-flowing liquid on the valve disc and said liquid back-flow is prevented.

2. An electric motor actuated stop and self-closing check valve according to Claim 1, further comprising

a hydraulically operated valve disc closing-speed regulator operatively attached to the valve to control the closing speed of the valve disc.

3. An electric motor actuated stop and self-closing check valve according to Claim 2, wherein said closing speed regulator comprises:

a cylinder operatively attached to the valve body,
a piston operatively attached to the disc stem for movement within said cylinder along its longitudinal axis, and

a hydraulic oil reservoir with connecting piping to the cylinder, said connecting piping having a solenoid valve and a check/needle valve, and

said solenoid valve and check/needle valve being piped in parallel arrangement.

4. An electric motor actuated stop and self-closing check valve according to Claim 1, wherein said valve body has a wye configuration or an elbow configuration.

5. An electric motor actuated stop and self-closing check valve according to Claim 1, wherein net flow area of the valve is no less than the cross-sectional area of the liquid conveying line and the valve is self cleaning.

6. An electric motor actuated stop and self-closing check valve according to Claim 1, wherein the valve body is of cast iron.

7. An electric motor actuated stop and self-closing check valve according to Claim 1, further including a flange on the inlet port and a flange on the outlet port of the valve body.

8. An electric motor actuated stop and self-closing check valve according to Claim 1, wherein said valve seat is replaceable and is fabricated of bronze or stainless steel.

9. An electric motor actuated stop and self-closing check valve according to Claim 1, further including at least one clean-out/inspection port disposed in the valve body.

10. An electric motor actuated stop and self-closing check valve according to Claim 1, wherein said valve disc is of cast iron or steel.

11. An electric motor actuated stop and self-closing check valve according to Claim 1, further comprising a renewable resilient seat on said valve disc.

12. An electric motor actuated stop and self-closing check valve according to Claim 11, wherein said renewable resilient seat is of rubber or UHMWPE (ultra high molecular weight polyethylene).

13. An electric motor actuated stop and self-closing check valve according to Claim 11, further comprising a follower ring for retaining the renewable resilient seat.

14. An electric motor actuated stop and self-closing check valve according to Claim 13, wherein said follower ring is of bronze or stainless steel.

15. An electric motor actuated stop and self-closing check valve according to Claim 1, wherein said valve disc is of stainless steel.

16. An electric motor actuated stop and self-closing check valve according to Claim 1, further including a bushing disposed between the disc stem and the valve body for guiding and facilitating the free movement of the valve disc and disc stem along the longitudinal axis of the disc stem.